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ABSTRACT

A study investigated the use of verbo-visual content in geography textbooks of various countries. Secondary school geography textbooks from Australia, Greece, Japan, Sweden, and the United States were examined. For each of the selected books, empirical data about the amount of texts, pictures, maps, and tables was gathered; contents were assessed; and the execution of texts, pictures, and layouts was assessed. Results indicated that: (1) Australian geography textbooks were of medium size and carried the largest amount of information; (2) Greek textbooks were rather small, carried a rather low amount of information, and had few maps and little text; (3) Japanese textbooks were the smallest, lots of text but few maps, and were the most cost-effective; (4) Swedish textbooks were rather large, had a lot of text structured by headings and subheadings, and had several maps but few large pictures; and (5) American textbooks were the largest but carried the least amount of information, had few maps and about the average number and average-sized pictures. (Thirteen tables of data are included; 29 references are attached.) (RS)

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The use of Verbo-Visual Information in Textbooks – a cross-cultural experience

by
Nikos Metallinos, Robert Muffoletto, Rune Pettersson, John Shaw and Yasuo Takakuwa

Introduction

IVLA, the International Visual Literacy Association, has now existed for more than two decades. Verbo-visual research is however mostly undertaken within individual countries and within specific cultures. Cross-cultural research is unfortunately still rather uncommon in this field. At the 21.st Annual IVLA Conference (which took place in Scottsdale, Arizona, USA, Oct. 25-29, 1989) the authors of this paper, representing five very different countries; Australia (John Shaw), Greece (Nikos Metallinos), Japan (Yasuo Takakuwa), Sweden (Rune Pettersson) and the the USA (Robert Muffoletto), found it a challange to try to do a limited verbo-visual study together. We discussed various verbo-visual problem areas. Since we had no budget at all for a joint project, and all of us have other duties, it seemed to be a good idea to make use of already existing low cost material.

Primary and secondary school text books do not take into consideration the rapidly developing visually oriented youth of the world. Therefore text books are in conflict with the daily lives of youngsters who are influenced by TV, video games, computerized pictures, etc. It is this common phenomenon which we have observed and which motivated us to look into the use of verbo-visual content in geography books of various countries. Using geography textbooks for secondary schools should make it possible for us to study:

1. "The use of verbo-visual information in textbooks", and
2. "Images of Australia, Greece, Japan, Sweden and the USA in geography textbooks".

In the first case, the emphasis should be on a discussion of content and execution, i.e. the actual presentation of the subject matter in different countries. Here it whould be possible to discuss the use of different types of illustrations for various functions. It would also be possible to study the integration of verbal and visual information as they blend together in the layout of the different textbooks.

In the second case it would be possible to make national reports about how our own countries are seen abroad. *"Geographical Education"* (6/1, 1989) published a collection of six specially commissioned articles on "Images of Australia in geogra-

phy textbooks". Kyokasho Kenkyu Sentah (1984) analysed how Japan was presented in foregin texts.

How do we measure illustrations?

In the study of visual literacy we frequently need methods or "tools" for "measuring" various picture properties. In fact there are several methods that can be used. However, we need to develop more.

Before publication

Picture descriptions (Pettersson, 1989) can be used before the original of a picture is finished. Before the technical production OBS and reading value ratings (Larssen and Skagert, 1982), the utility/originality rectangle (Pettersson, 1989), the redundancy/information line (Berefelt, 1976), the redundancy/information/-communicative impact model (Pettersson, 1989), the interest/perception model (Pettersson, 1989), the legibility/reading value rectangle (Pettersson, 1989), and the picture readability index (Pettersson et. al., 1984) as well as the "picture presentation form" (see next page), can be used.

After publication

After the actual publication of the images we can use a picture analysis, i.e. a descriptive rating of a picture, and various practical tests can be carried out to determine whether or not an information disseminator's intentions are accurately realized (Pettersson, 1989). Values and attitudes may be measured with semantic differential scales in which the sender and/or receivers report how positively or negatively they respond to a given picture in overall terms or with respect to individual picture variables or functions (Marsh, 1983, Pettersson et. al. 1984, Pettersson, 1989). In this way we can make assessments of verbal as well as of visual contents and execution.

Goldsmith (1980, 1984, 1986) offers an analytical model for illustrations. Her model consists of twelve elements which are formed by the interaction of four visual factors with three levels of communication. The four visual factors are: *unity*, which refers to a single image; *location*, the spatial relationships between two or more images within a single picture; *emphasis*, the hierarchical relationships between images; and *text parallels*, the relationship between text and picture. The three levels of communication are: *syntactic*, which does not assume any recognition or identification of images; *semantic*, which concerns the basic recognition of an image; and *pragmatic*, which reminds us that readers will differ in age, sex, education and so on.

Number of illustrations

Evans, Watson and Willows (1987) discuss the use of visuals in Canadian textbooks. They analyzed 11.236 textbook pages. 8.304 pages had illustrations. Like Willows, Borwick and Hayvren (1981) they used two different methods of measuring visuals/pictures/illustrations. They calculated an *"index of frequency"*, that is the number of pages with any visuals in percent of all pages (except title pages and indexes). The average index of frequency was 74% (8 304 pages with illustrations is 74% of all 11 236 pages). In lower grades almost all pages had illustrations (95-

99%). For higher grades the index of frequency went down considerably (Appendix 1).

In textbooks, however, many pages have more than one picture. When visuals are used for information the "actual number of illustrations" seem to be much more important than the number of pages with illustrations. A *"picture index"*, defined as the average number of pictures for 100 pages, will no doubt be a better measure and more suited for international and inter-cultural comparisons of textbooks (Pettersson, 1990). It is possible to calculate both the index of frequency and the picture index from the data given by Evans et. al. (1987) in their Appendicies B and C. As seen from these data (Appendix 1) the index of frequency and the picture index really give complementary information about the textbooks. It is easy to see how the character of these textbooks changes from the lower to the higher grades within each group of subject matter.

Size of illustrations

Evans, Watson and Willows (1987) also looked at all pages with visuals and "mentally" divided them in four categories with respect to the "areas with visuals"; 0-25%, 26-50%, 51-75% and 76-100% of the page size. In lower grades many pages had large areas with visuals. For higher grades more pages had smaller areas with visuals. It may however be easier to mentally divide the page in six parts; 1/6 (1-17%), 2/6 (18-33%), 3/6 (34-50%), 4/6 (51-67%), 5/6 (68-83%), and 6/6 /84-100%), then add all the sixth parts and calculate the average picture size.

Picture presentation forms or forms of illustrations

Sloan (1971) discussed four *pictorial artistic styles*; (1) photographic, (2) representational, (3) expressionistic, and (4) cartoon. Photographic style was defined as a colored photograph of the subject. Representational style was defined as an artist´s rendition of the subject which conforms to the subject in its true form. Expressionistic style was defined as an artist´s rendition of the subject which leans heavily towards abstraction. Cartoon style was defined as an animated caricature of the subject. These four artistic styles form a realistic to an abstract continuum.

Dondis (1973) discussed the anatomy of a visual message. We express and receive visual messages on three *levels*; (1) representationally, (2) symbolically, and (3) abstractly. Representational forms of illustrations are actual photographs of things. In symbolical forms pictures show one thing and connote another. In abstract forms illustrations provide minimal visual information on the phenomenon illustrated. In addition to size, shape, color etc, the way pictures are shot is important. The aesthetic value of a long shot is different from that of a medium shot or close-up. Metallinos (1990) have developed a schema which explains these three forms of picture presentations in accordance with their functional aesthetic value. A scene can be presented (1) objectively (usually a long shot), (2) subjectively (usually a close-up), or (3) creatively (created by the medium itself, for example, superimposition, picture montage, etc.) (Zettl, 1990).

Methodology

We decided to select geography textbooks for senior level pupils, which presented our different countries. For each one of the selected textbooks we wanted to get 1, information for identification of the books; 2, empirical data about the amount of

texts, pictures, maps and tables; 3, assessments of contents; and 4, assessments of execution of texts, pictures and layouts. We wanted to use the following sets of variables.

1. For identification
Title
Name of author/authors
Name of publishing company
Place of publication
ISBN (International Standard Book Number)

2. Empirical data
A. The complete book
Page size (height x width in millimetres)
Total number of pages

B. For each of the selected sections (dealing with Australia, Greece, Japan, Sweden and the USA respectively) we wanted to get the following information

Sections
Number of pages for each section

Text[1]
Number of headings
Number of legends
Total number of words in the section (in headings, running text and captions or legends)
Text index, *Tex* (defined as the average number of words per page in the selected section)

1. To be able to compare the volume of the texts for the selected sections in text-books produced in different countries we realized that it would be important to translate the books from Greece, Japan and Sweden to English. All counts should then be made in the English text-versions. However, since this is a non-budget-project this was unfortunately not possible to do.

Pictures
Number of color photographs
Number of black and white photographs
Number of realistic drawings in color
Number of line drawings (inclusive of diagrams and other schematic pictures)
Total number of illustrations in the section
Picture index, *Pex* (defined as the average number of pictures per page x 100)
Average picture size (the average part of a page in the section covered by pictures)
Illustration index, *Ilex*, (defined as the average number of pictures and maps per page x 100)

Numerical information[2]
Number of tables
Number of numerical values

Numerical index, *Nex* (defined as the average number of numerical values per table)

***Maps*[2]**
Number of maps
Number of names on the maps
Number of signs and symbols on the maps
Map index, *Mex* (defined as the average number of names + signs and symbols on the maps)

2. Since we had chosen geography as a subject matter we also wanted to look at the use of tables and maps. However, we found it very hard and of minor importance to try to calculate the number of names, signs and symbols on the maps. Thus we only counted the number of maps as well as the number of tables.

3. Assessments of contents

For each of the selected sections (dealing with Australia, Greece, Japan, Sweden and the USA respectively) we needed and wanted to have several experts on the subject matter to do qualitative assessments of the complete section text and all the illustrations. For qualitative assessments it is possible to use semantic differential scales (Pettersson et. al. 1984, Pettersson, 1989). The combination of verbal and numerical scale steps makes it possible to do statistical calculations of e.g. mean values. Such a scale can be designed as follows: 0, very bad (10), bad (30), neither bad nor good (50), good (70), very good (90) and 100.

It was however not possible to engage subject matter experts in this project. We had to make all the assessments ourselves. Whether the information in the textbooks is accurate, correct and up-to-date are therefore no more than subjective and more or less informed guesses according to the following quidelines.

Text

Selection of information. Assess if what you judge as important information about the country is presented or not in the text. To what extent is the information correct? To what extent is the information modern and how much is too old?

Reading value. To what extent is the information content in the text interesting for the readers?

Readability. To what extent is the text readable for the readers? Readability can be defined as the degree of linguistic difficulty, i.e. the sum of the linguistic properties of the text.

Relationship between text and illustrations. Is there a redundant, relevant, irrelevant or contradictory relationship between text and pictures? Are there references from the text to the illustrations?

Pictures

Functions of pictures. Assess if the pictures convey any information relevant to the subject matter? Are the pictures aesthetically appealing? Are the pictures mainly used for decoration without any connection to the text?

Reading value. To what extent is the information content in the pictures interesting for the readers?

Readability. To what extent are the pictures readable for the readers? Readability can be defined as the degree of linguistic difficulty, i.e. the sum of the linguistic properties of the pictures.

Connotations. Most pictures are ambiguous. There is often a major difference between their denotations, i.e. their literal meanings, and their various connotations, i.e. their associative meanings. Is there a risk that the pictures have a prejudice against gender or various ethnical groups of people?

4. Assessments of execution

For assessments of execution we also used semantic differential scales as discussed above (3). In this case, however, we feel that we have some more expert knowledge to make the assessments.

Text

Text legibility. To what extent is the text legible for the readers? Legibility of text refers to the text's external properties such as typographic style.

Pictures

Picture legibility. To what extent are the pictures legible for the readers? Legibility of pictures refers to the external properties of the pictures such as varying pictorial styles.

Layout

Layout communication. To what extent are the layouts making it easier for the readers to understand the information?

Collection of data

Data from Australia

1. Identification

I. Data for Grece

Title:	Our Changing World
Sub-title:	Book 2 The Expanding Artificial Ecosystems
Authors:	Colin Sale, Graeme Wilson, Ben Friedman
Publisher:	Longman Cheshire, Australia
Printed:	Kuala Lumpur, 1982
ISBN:	0-582-68236-3

II. Data for Japan and the USA

Title:	Our Changing World
Sub-title:	Book 3 The Development of Nations
Authors:	Colin Sale, Graeme Wilson, Ben Friedman
Publisher:	Longman Cheshire, Australia
Printed:	Hong Kong, 1983
ISBN:	0-582-68274-6

2. Empirical data

A The complete books

Page size: 238 mm (h) x 183 mm (w) for both books

Pages: Book 2, 237pp; and Book 3, 267 pp

B Information

Sections	Greece	Japan	Sweden	USA
Section pages	13	34	–	46
Headings and subheadings	30	66	–	45
Legends	16	46	–	67
Words per section	4,838	12,565	–	17,612
Color photographs	21	36	–	29
B/W photographs	2	8	–	19
Realistic drawings in color	0	0	–	6
Line drawings	1	11	–	1
Total number of pictures	24	55	–	55
Average picture size	1/6	1/6	–	1/6
Maps	5	11	–	21
Tables	2	9	–	10

General comments

The information presented here has been compiled from two books in a series of three Australian geography textbooks, designed for use in junior secondary schools. These texts have proved to be among the most popular geography books for these grades, and teachers of junior school geography courses in all states of Australia have used them. The focus of the content in these books is upon the accelerating impact of people on their natural environments, and the resulting changes that occur. In terms of educational objectives, the emphasis is on the development of concepts and skills. Methodologically, these books adopt an inquiry approach and encourage the use of first-hand learning resources, some of which are included within the textbook; each chapter begins with a series of focus questions, which lead to an analysis of the main features of a selection of the world's major ecosystems.

This series of textbooks does not treat geographic studies on a country-by-country basis nor in the other type of continental-regional-national approach. The books have a thematic framework, and the studies of countries are used as examples to illustrate the themes. Unfortunately, no Swedish examples have been included in these texts; hence the data presented covers only three countries: Greece, Japan and the theUSA.

The *Greek section*, from Book 2, is a regional study of the nation as an example of the 'Altered Mediterranean Lands', under the heading: 'Greece – coping with past neglect'.

The *Japanese section*, from Book 3, is a sample study of a high-technology nation, under the chapter title 'Booming Japan', and sub-titled 'Economic Advancement using imported raw materials, new technology and diligent labour'.

The *American section*, from Book 3, is also a sample study of a high-technology nation under the chapter title 'Affluent USA', with the sub-title 'Economic Progress through exploitation of vast resources, with extensive capital...'

3. Assessments of contents

Sections	Greece	Japan	Sweden	USA
Selection of information	70	70	–	70
Reading value	80	80	–	80
Readability	80	80	–	80
text/illus relationship	70	70	–	70
Functions of pictures	70	70	–	80
Reading value	60	60	–	70
Readability	70	60	–	70
Connotations	70	70	–	70

4. Assessments of execution

Sections	Greece	Japan	Sweden	USA
Text legibility	80	80	–	80

Picture legibility	70	60	–	70
Layout communication	70	70	–	70

Data from Greece

1. Identification

I. Data for Australia, Japan and the USA

Title: Geography of the Continents
Authors: A. Zamanis, G. Levaditis and V. Sambo
Publisher: Association for the Publication of Instructional Books, Athens
Printed: Athens, 1984
ISBN: non existant

II. Data for Sweden

Title: Geography of Europe
Authors: S. Oreinou-Manglry and S. Papasemakopoulos
Publisher: Association for the Publication of Instructional Books, Athens
Printed: Athens, 1987
ISBN: non existant

2. Empirical data

A The complete books

Page size: 238 mm (h) x 167 mm (w) for both books
Pages: 230 (1st book) and 204 (2nd book)

B Information

Sections	Australia	Japan	Sweden	USA
Section pages	7	7	(12)	18
Headings and subheadings	4	6	6	15
Legends	–	–	–	–
Words per section	540	1150	?	2280
Color photographs	7	7	0	18
B/W photographs	0	0	0	0
Realistic drawings in color	1	2	1	1
Line drawings	0	0	5	1
Total number of pictures	8	9	6	20
Average picture size	3/6	3/6	2/6	2/6
Maps	1	1	3	3
Tables	0	0	4	2

General comments

The data collected here are taken from two Greek textbooks on geography for the beginning high school level. In the Greek primary and secondary educational system, all text books are published by a government run publishing company, and the text book authors are selected and commissioned by the Ministry of Education. Geography is introduced in both the primary and secondary educational systems, and it is taught in three subjects as follows: (1) Geography of the Continents, (2) Geography of Europe, and (3) Geography of Greece. There are textbooks for all levels for each subject. It is because of this categorization that information about Sweden is not contained in the text titled *Geography of the Continent* from which the information for Australia, Japan, and the USA was extracted. Information about Sweden, therefore, is taken exclusively from the textbook *Geography of Europe*. This text differs from the other in that it collectively provides information about regions of Europe rather than individual countries. For example, most geographical information about Sweden's borders, climate, agriculture, industry, culture etc., is provided in connection with Norway, Finland, Denmark and Iceland, all of which constitute the so-called Northern European Countries. This hinders the students' understanding of Sweden as a separate nation.

3. Assessments of contents

Sections	Australia	Japan	Sweden	USA
Selection of information	50	40	60	30
Reading value	60	50	50	40
Readability	60	50	60	40
text/illus relationship	40	30	50	10
Functions of pictures	30	30	50	20
Reading value	40	40	60	30
Readability	30	30	50	20
Connotations	40	30	60	20

4. Assessments of execution

Sections	Australia	Japan	Sweden	USA
Text legibility	60	60	60	50
Picture legibility	50	50	50	40
Layout communication	40	30	60	30

Data from Japan

1a. Identification

Title: Shinpen Atarashii Shakai (Chiri)
Authors: Kawata, Tadashi; Bito, Masahide; Yamaga, Seiji and others
Publisher: Tokyo Shoseki Co. Ltd.
Printed: Tokyo, 1989
ISBN: non existant

2a. Empirical data

A The complete book
Page size: 210 mm (h) x 149 mm (w)
Pages: 303

B Information

Sections	Australia	Greece	Sweden	USA
Section pages	4 (+4)	0	0	6 (+7)
Headings and subheadings	8 (+3)	–	–	12 (+3)
Legends	7	–	–	10
Characters per section	1502	–	–	2221
Color photographs	0 (+2)	0 (+2)	–	0 (+3)
B/W photographs	3 (+2)	–	–	6 (+1)
Realistic drawings in color	0	–	–	0
Line drawings	3 (+17)	0 (+2)	–	6 (+30)
Total number of pictures	6 +(21)	0 (+4)	–	12 (+34)
Average picture size	1/6	–	–	1/6
Maps	1	0	–	3
(regional maps)	(+4)	(+6)	(+7)	(+7)
Tables	0 (+)	0	0 (+1)	0 (+2)

General comments

These two books (above and below) are the most used textbooks in geography for the lower secondary schools (grades 7-9) in Japan.

Lower secondary schools serve as a part of 9-years' compulsory education in Japan as well as six-year elementary schools beginning at children's age of six.

There is no chance for Japanese children to study geography outside of Japan in elementary schools.

In Japan, every elementary and secondary textbook is checked by the Ministry of Education, Science and Culture (MESCJ), to see whether it is written in accordance with the

respective Course of Study issued by MESCJ, which explains the standard of curriculum in elementary, lower secondary and upper secondary schools.

All textbooks, therefore, are similar in size, volume and content structure, even though each one could have its own characteristics in some way.

As far as geography is concerned, Japanese pupils learn about Japan in elementary level followed by more intensive domestic geography and world geography in lower secondary level.

Regional studies are, therefore, not necessarily country by country style except some important countries and/or typical ones of specific regions.

In textbook A (above), the USA covers 6 pages and Australia 4 pages, compared with no pages on Greece nor Sweden. Greece is included in the introductory section "Northern and Southern Europe" without mentioning Greece as a country. Nothing is referred to Sweden but a name for exporting country of minerals to West Germany.

In textbook B (below) 14 pages for the USA, 4 for Australia and 1 for Sweden but nothing for Greece.

As mentioned above, Japanese textbooks explain world geography in integrative way with the life of Japanese. So, some explanations and illustrations or diagrams could be found outside of each part of the books referring to specific countries apart from the respective parts. The numbers with a + sign in parenthesis refer to these.

3a. Assessments of contents

Sections	Australia	Greece	Sweden	USA
Selection of information	50	–	–	50
Reading value	40	–	–	50
Readability	50	–	–	60
text/illus relationship	40	–	–	50
Functions of pictures	40	–	–	50
Reading value	40	–	–	40
Readability	50	–	–	60
Connotations	40	–	–	40

4a. Assessments of execution

Sections	Australia	Greece	Sweden	USA
Text legibility	50	–	–	50
Picture legibility	60	–	–	60
Layout communication	60	–	–	50

1b. Identification

Title: Shakaika Chugaku Shinchiri
Authors: Noh, Toshio; Tanaka, Kenichi; Yazawa, Daiji; Sato, Hisashi and others
Publisher: Teikoku Shoin
Printed: Tokyo, 1990
ISBN: non exisyant

2b. Empirical data

A The complete book
Page size: 210 mm (h) x 149 mm (w)
Pages: 304

B Information

Sections	Australia	Greece	Sweden	USA
Section pages	4	0	1	14
Headings and subheadings	7	–	1	14
Legends	7	–	3	14
Characters per section	1346	–	377	4508
Color photographs	0 (+4)	0 (+1)	0 (+1)	0 (+8)
B/W photographs	5 (+2)	–	0	10
Realistic drawings in color	0	–	0	0

Line drawings	11 (+7)	–	1 (+1)	29 (+31)
Total number of pictures	16 (+13)	– (+1)	1 (+2)	39 (+39)
Average picture size	1/6	–	1/6	1/6
Maps	2	–	0	2
(regional maps)	(+4)	(+3)	(+4)	(+3)
Tables	1	–	0	0 (+2)

General comments
See 2a above.

3b. Assessments of contents

Sections	Australia	Greece	Sweden	USA
Selection of information	50	–	60	50
Reading value	60	–	40	60
Readability	50	–	50	40
text/illus relationship	40	–	40	50
Functions of pictures	40	–	40	40
Reading value	50	–	50	50
Readability	40	–	50	50
Connotations	40	–	40	40

4b. Assessments of execution

Sections	Australia	Greece	Sweden	USA
Text legibility	60	–	50	60
Picture legibility	50	–	50	50
Layout communication	50	–	60	60

Data from Sweden

1. Identification

Title: Geografi för högstadiet
Authors: Gösta Wennberg, Hans Tillman and Åke Lindström
Publisher: Esselte Studium
Printed: Stockholm, 1987
ISBN: 91-21-04541-0

2. Empirical data

A The complete book
Page size: 239 mm (h) x 210 mm (w)
Pages: 288

B Information

Section	Australia	Greece	Japan	USA
Section pages	6	0	8	14
Headings and subheadings	15	0	18	37
Legends	6	1	11	19
Words per section	2074	57	2463	4393
Color photographs	4	1	4	7
B/W photographs	1	0	2	3
Realistic drawings in color	0	0	0	1
Line drawings	0	0	1	2
Total number of pictures	5	1	7	13
Average picture size	2/6	–	2/6	1/6
Maps	1	1	5	10
Tables	0	0	0	2

General comments

This is the most used textbook in geography for senior level students in the Swedish compulsory, comprehensive school (years 7, 8 and 9). The 9-year Swedish compulsory, comprehensive school is roughly equivalent to the American elementary school + junior high school, although Swedish students start school at the age of 7. The Swedish comprehensive school is divided into three levels, i.e. junior (1-3), intermediate (4-6) and senior (7-9) levels

This geography textbook is very much a blend of thematic presentations like "Climate and weather" and "Transportations", as well as presentations of some countries. All countries are discussed in several sections of the book. Australia is discussed in 2 different places, Greece in 4 places, Japan in 11 places and the US in 6 places. Australia is presented as a country (above called "section") in 6 pages, Greece in 0 pages, Japan in 8 pages and the USA in 14 pages.

Australia, Japan and the USA are mentioned in a general discussion about climates and weather. Japan is also mentioned in reference to volcanic activities, foresting in South America, modern fishing, production of steel with use of coal imported from Australia. Japan is also mentioned as an example of a nation which have had a rapid industrial development. The main discussion on of Greece is a part of the section "Southern Europe". Greece is also mentioned in a discussion on the Climate of Europe and as a member of EG. Like Japan also the USA is using a lot of raw materials. USA is also mentioned with reference to emigrants from Europe and for pollution of the environment. Swedish pupils learn about Sweden in the lower levels.

In Sweden Borgström (1988) made a comprehensive study of "the image of Greece in textbooks in Sweden". She studied almost 50 textbooks in geography, history, religion and social studies and found that the image of Greece is old-fashioned and un-fair. This is especially true with respect to the use of illustrations. Pictures frequently show old monuments and poor people at the countryside. The modern industry is not discussed.

3. Assessments of contents

Section	Australia	Greece	Japan	USA
Selection of information	50	–	40	40
Reading value	50	–	50	50
Readability	50	–	50	50
text/illus relationship	50	–	60	60
Functions of pictures	60	–	50	50
Reading value	50	–	50	50
Readability	50	–	60	50
Connotations	40	–	60	60

4. Assessments of execution

Section	Australia	Greece	Japan	USA
Text legibility	50	–	60	60
Picture legibility	50	–	50	50
Layout communication	50	–	60	60

Data from USA

1. Identification

Title: Our World: Lands and Cultures
Authors: Joan Schreiber, William Stepien, John Patrick, Richard Remy, Geneva Gay and Alan Hoffman
Publisher: Scott Foresman and Company
Printed: 1983
ISBN: 0-673-22016-8

2. Empirical data

A The complete book

Page size: 260 mm (h) x 210 mm (w)
Pages: 480

B Information

Sections	Australia	Greece	Japan	Sweden
Section pages	8	1	8	3
Headings and subheadings	4	–	7	1
Legends	2	–	2	1
Words per section	1470	–	2220	570
Color photographs	11	–	19	2
B/W photographs	0	–	0	0
Realistic drawings in color	2	–	1	0
Line drawings	0	–	0	0
Total number of pictures	13	–	20	2
Average picture size	2/6	–	2/6	1/6
Maps	2	–	3	1
Tables	1	–	0	0

General comments

The collected data comes from a widely used USA textbook for middle school students. The text is part of a series that covers K-7 grades. The book is designed around content and thematic concerns and is not centered on individual countries. Very few countries are covered in any respectful manner. Content areas include; History, Geography, Government, Economics, Anthropology, Sociology and Psychology. Themes included; Independence, Diversity, Power, Identity, Socialization, Choices, and Change.

The section on *Australians* consists of 3 lessons (parts); The Australian Past, Resources in Australia Today, How Australians Use Their Resources.

There is no section on *Greece*. The only mention of Greece was in one paragraph on the Common Market (Two sentences),.

Japan is divided into five (5) subsections dispersed throughout the book. Each subsection is presented within a theme being explored. The subsections are titled; The Land and the People, Social Groups in Japan, Religion in Japan, Technology in Japan, Art in Japan.

Sweden is mentioned in respect to wars with Norway and provided an example of a country with a power-less king, a "King Who Does Not Rule". The discussion is located in a theme section entitled "Local and Regional Leaders".

3. Assessments of contents

Sections	Australia	Greece	Japan	Sweden
Selection of information	50	–	60	10
Reading value	60	–	60	50
Readability	60	60	60	60
text/illus relationship	60	–	70	60
Functions of pictures	70	–	80	50
Reading value	80	–	80	50
Readability	80	80	80	80
Connotations	70	–	70	70

4. Assessments of execution

Sections	Australia	Greece	Japan	Sweden
Text legibility	80	80	80	80
Picture legibility	80	–	80	80
Layout communication	70	–	70	50

Results

Empirical data

First of all it should be notet that the total amount of verbal and visual information is very different in the different books (Table 1). The sections studied in the Australian books carry about nine times more words than the sections in the Greek books and eight times more words than the sections in the book from the USA. The Australian books also have more pictures and more maps than the other books. It is quite obvious that children in different countries have to study very differnt amounts of information about the world outside their own country.

Please note that the Japanese language is written using three different types of characters – *kanji* (Chinese characters) and two kinds of *kana* (*hiragana* and *katakana*). *Kana* is seen as the Japanese alphabet. Japanese sentences are written and read vertically and/or horizontally from left to right.

国々を結んで国際列車が走り，フランスと西ドイツの間

のように，自動車が止まらずに通れる国境もある。

An example of how Japanese sentences are written, horizontally in this case, is shown here. This is an extract from one of the textbooks (a).

In general, each Japanese word is written continually, or in other words, not separately from other words. Moreover, division of a sentence into words depends upon the linguistic theoretical framework of each scholar. It is, therefore, difficult to calculate text index in the same meaning as in western languages.

Japanese publishers, however, estimate the average amount of characters corresponding to one western word, as they need to esteem the whole volume of pages when a translated publication from western languages is planned. According to this estimation, the average amount of characters per one western word is 3.1. In this project this relationship has been used when calculating the number of words for Japanese texts.

Table 1. Amount of information in selected sections

Books from	section pages	Number of words*	pictures	maps
Australia	93	35,015	134	37
Greece	44	3,970	43	8
Japan	29	3,211	73	8
Sweden	28	8,988	26	17
USA	20	4,260	35	6
Total	214	55,444	311	76

* for Japan it is the estimated number of words (a total of 9,954 characters)

From the available raw country by country data we have calculated the text index (Table 2), text structure (Table 3), picture index (Table 4), picture sizes (Table 5), book sizes (Table 6), the number of words per picture (Table 7), the number of maps (Table 9), the illustration index (Table 10), and the types of illustrations (Table 11).

Text

With exeption for the textbook from Greece the text index (Table 2) is about the same in our different geography textbooks. The rank order is as follows: Australia, Sweden, the USA, Japan and Greece.

Table 2. Text index, Tex

Books from	Descriptions of					
	Australia	Greece	Japan	Sweden	USA	M**
Australia	–	372	370	–	383	375
Greece	77	–	164	–	127	90
Japan*	115	–	–	109	111	111
Sweden	346	–	308	–	314	321
USA	184	–	278	190	–	213
Overall mean text index						222

* mean values for two textbooks of estimated number of words (357, –, –,337, 346, and 343 characters)

** these mean values are calculated on the total number of section pages and the total number of section words and not calculated on the section means

The text in the various textbooks are differently structured (Table 3). The books from Greece and Sweden have the lowest number of words per heading and subheading. The book from the USA has got the longest segments of text.

In the books from Australia almost all illustrations have legends. In the books from Greece no illustrations have legends. In the book from the USA very few illustrations (12%) have legends.

Table 3. Text structure

	In books from					
	Australia	Greece	Japan	Sweden	USA	M
Number of words per heading and subheading	247	158	237	128	355	225
Frequency of illustrations with legends (%)	96	0	65	86	12	52

Pictures

It could be noted that the textbooks from Japan, the USA and Australia have far more pictures than the textbooks from Greece and Sweden (Table 4). The textbooks from Australia and Japan have the smallest pictures (Table 5) and the textbooks from Greece, Sweden and the the USA have the largest pictures. The textbooks vary considerably in size (Table 6). The largest book (from the USA) is 1.7 times the size of the smallest (from Japan).

Table 4. Picture index, Pex

Books from	Descriptions of					
	Australia	Greece	Japan	Sweden	USA	M**
Australia	–	185	153	–	120	143
Greece	114	–	129	50	111	98
Japan*	89	–	–	97	77	81
Sweden	83	–	88	–	93	93
USA	163	–	250	67	–	175
Overall mean picture index						118

* mean values for two textbooks (estimated number of words)

** these mean values are calculated on the total number of section pages and the total number of section pictures and not calculated on the section means

Table 5. Picture Sizes

Books from	Descriptions of					
	Australia	Greece	Japan	Sweden	USA	m
Australia	–	1/6	1/6	–	1/6	1/6
Greece	3/6	–	3/6	2/6	2/6	2/6
Japan*	1/6	–	–	1/6	1/6	1/6
Sweden	2/6	–	2/6	–	2/6	2/6
USA	2/6	–	2/6	1/6	–	2/6

* mean values for two textbooks

Table 6. Book Sizes

Books from	height (mm)	width (mm)	page (mm^2)
Australia	238	183	43554
Greece	238	167	39746
Japan	210	149	31290
Sweden	239	210	50190
USA	260	210	54600

Text and Pictures

For the study of the relation between verbal and visual information in textbooks it is interesting to calculate the number of words per picture (Table 7). The number of words per picture seem to be very different in our sample of geography textbooks. Excluding Japan the rank order is as follows: Sweden, Australia, the USA and Greece.

Table 7. Words per picture

Books from	Descriptions of					
	Australia	Greece	Japan	Sweden	USA	M**
Australia	–	202	229	–	320	278
Greece	68	–	128	–	114	92
Japan*	54	–	–	41	48	44
Sweden	414	–	352	–	338	345
USA	113	–	111	285	–	122
Overall mean words per picture						176

* mean values for two textbooks of words per picture (167, –, –, 126, 150 and 136 characters per picture)

** these mean values are calculated on the total number of section words and the total number of section pictures and not calculated on the section means

The information about Tex (Table 2), Pex (Table 3) and the number of words per picture (Table 7) suggests that Greece, the USA and Japan are much more image-oriented countries than Sweden and Australia. The USA-representative believe that the USA textbook is representative of a general shift from broad general written descriptions to a reliance on visuals to convey concrete and narrative descriptions. In general , we have seen that lower school levels used more illustrations than higher levels. In Greece, the elementary school geography books have more illustrations and much less writen text.

An editor in chief (of one of the Japanese textbooks used in this study) explained to the Japanese researcher that the publishing company use visual materials very often because:

1 Visual presentation can convey more information than text in the situation of existing regulation of the whole volume of a textbook (book size and pages) and the size of type used,
2 Visual presentation gives more space for free and open conceptualization from the presented information than text on the students´side, and
3 technological development in printing made it possible.

The editor in chief concludes that inclination to visualization has been a dominant tendency since a couple of decades.

Since we actually do not know if the geography textbooks in our sample can be considered as representative for "textbooks" in general the Swedish representative made an analysis of some Swedish *science textbooks*, for the same grade levels. This analysis showed that the picture indexes for these books are far higher than the picture index for the Swedish geography textbook (Table 8). This indicates that we can not draw any conclusions about textbooks in general.

Table 8. Data from four Swedish textbooks in a Science textbooks series for grades 7-9.

Textbooks	Number of pages	Number of pictures	Picture index
Fysik (Physics)	282	436	155
Kemi (Chemistry)	188	322	171
Teknik (Technical science)	160	545	339
Biologi (Biology)	379	809	213
Total	1009	2112	209
Geography	288	310	108

It is obvious that the number of maps may be very important in geography textbooks. The books from Australia have far more maps than the books from Greeece, Japan and the USA (Table 9).

Table 9. Number of maps

Books from	Descriptions of					
	Australia	Greece	Japan	Sweden	USA	Total.
Australia	–	5	11	–	21	37
Greece	1	–	1	3	3	8
Japan*	3	0	–	–	5	8
Sweden	1	1	5	–	10	17
USA	2	0	3	1	0	6

* mean values for two textbooks

When we compare the illustration index (Table 10) with the picture index (Table 4) the main structure remains with the books from Japan, the USA and Australia in the top of the ranking list and Greece and Sweden at the bottom..

Table 10. Illustration index, Ilex

Books from	Descriptions of					
	Australia	Greece	Japan	Sweden	USA	M**
Australia	–	223	194	–	165	183
Greece	129	–	143	75	128	116
Japan*	101	–	–	97	86	90
Sweden	100	–	150	–	164	154
USA	188	–	288	100	–	205
Overall mean illustation index						150

* mean values for two textbooks of words per picture (101, –, –, 300, 266 and 279 characters per picture)
** these mean values are calculated on the total number of section pages and total number of pictures and maps and not calculated on the section means

There are main differences in the types of illustrations used or in the "illustration profiles" for the different textbooks (Table 11). Overall there are very few realistic drawings in color. The books from Australa and Sweden have illustrations of all kinds. The books from the USA and Grece are dominated by color photographs. Line drawings are the most common type of illustration in the books from Japan. As seen earlier (Table 9) all books have maps.

Table 11. Types of illustration (in %)

	In books from					
	Australia	Greece	Japan	Sweden	USA	M*
Color photo.	54	63	10	40	78	38
B/W photo.	16	0	14	13	0	12
Real. draw. in color	5	10	0	2	7	3
Line drawings	7	12	66	7	0	30
Maps	19	16	10	38	15	17

* these mean values are calculated on the total number of section pages and total number of pictures and maps and not calculated on the section means

Assessment of contents

The assessments of contents show a high level of correspondence for the various sections in each textbook. This would mean that the different authors treat different countries equally good or bad. In this case however, this result might also be caused by our *subjective* and more or less informed guesses. From the available raw country by country data we have calculated mean values of the assessments of contents (Table 12). Only the textbooks from Australia can be considered "good". All the other textbooks were assessed as "neither bad nor good".

Table 12. Mean values of assessments of contents

	In books from				
Contents	Australia	Greece	Japan	Sweden	USA
Text					
Selection of information	70	45	52	43	40
Reading value	80	50	52	50	57
Readability	80	53	52	50	60
text/illus relationship	70	33	44	57	63
Pictures					
Functions of pictures	73	33	42	53	67
Reading value	63	43	46	50	67
Readability	66	33	50	53	80
Connotations	70	38	40	53	70

Assessment of execution

Also here the assessments usually show a high level of correspondance for the various sections in each textbook. From the available raw country by country data we have calculated mean values of the assessments of execution (Table 13). Only the textbooks from Australia can be considered "good". All the other textbooks were assessed as "neither bad nor good".

Table 13. Mean values of assessments of executions

Execution	In books from Australia	Greece	Japan	Sweden	USA
Text legibility	80	58	54	57	80
Picture legibility	66	48	54	50	80
Layout communication	70	40	56	57	63

The use of verbo-visual information

It may be concluded from this study that the "tools" that we have used: text index, picture index, illustration index and assessments of contents and execution really can be used for cross-cultural comparisons of verbo-visual information. In this specific case we found interesting similarities and differences between the books used in various countries.

The study of geography has changed a great deal since all of us went to school. In terms of educational objectives, the emphasis today is on the development of concepts and skills. Most modern textbooks do not treat geographic studies on a country-by-country basis nor in the other type of continental-regional-national approach. Today geography textbooks usually have a thematic basis or framework and select illustrative examples of these themes from various countries. Often the information about a country is confined to one or a few particular themes. In our case all countries were not included in all texts.

In Sweden it is stipulated in the official curriculum that pictures and especially maps and statistical tables, charts and graphs should be used in the study of geography. Teacher education programs in universities and colleges in many countries place some considerable emphasis on maps as visual learning resources. The use of maps is advocated by geography educators as an important means of presenting information for analysis and for the understanding of environmental relationships. Also, the skills of map reading and map interpretation are given prominence in these programs; these skills are recognized as significant ones to be developed in studies of geography. Hence, the textbooks, particularly those used in secondary schools, reflect this philosophy concerning the role and importance of maps, and so they include quite a variety of maps of different types.

In this study we have compared sections in geography textbooks from Australia, Greece, Japan, Sweden and the USA. Relative to each other these textbooks may be briefly categorized in the following ways.

Australia

The geography textbooks from Australia are of medium size. The selected sections are large and carry the largest amount of information. These books have a lot of text, many maps and about the average number of small pictures. Most pictures are color photographs. These textbooks have illustrations of all types and most illustrations have legends. All this indicate a rather high input of editorial work. The contents and the execution were assessed as "good".

Greece

The geography textbooks are rather small. The selected sections are rather small and carry a rather low amount of information. These books have a little amount of text, few maps and few but large pictures. All of the pictures are color photographs. There are no B/W photograps, and a few illustrations have legends. All this indicate a "medium" input of editorial work. The contents and the execution were assessed as "neither bad nor good".

Japan
The geography textbooks are the smallest in this sample. These books have a lot of text, few maps but many and small pictures. Line drawings are the most common type of illustration. There are no relalistic drawings in color. There are some color as well as B/W photographs in front pages and other parts of the textbooks. Many illustrations have legends. The Japanese characters seem to be very "size-effective". The Japanese books are probably the most "cost-effective". All this indicate a high input of editorial work. The contents and the execution were assessed as "neither bad nor good".

Sweden
The geography textbook is rather large. This book has a lot of text structured by many headings and subheadings. There are several maps and few but large pictures of all types. Most illustrations have legends. All this indicate a rather high input of editorial work. The contents and the execution were assessed as "neither bad nor good".

USA
The geography textbook is the largest one in this sample. The selected sections are small and carry the lowest amount of information. This book has less than average text with many words per heading and subheading. There are few maps and about the average number and the average sized pictures. Most pictures are color photographs. There are no B/W photograps and no realistc drawings in color. Very few illustrations have legends. All this indicates a rather low input of editorial work. The contents and the execution were assessed as "neither bad nor good".

Images of Australia, Greece, Japan, Sweden and the USA

From the country by country data it can be noted that the "images" of our countries differ a lot. The following are short personal statements regarding the images of our own countries as they appear in the other textbooks.

Australia, Comments from John (Maybe with a reference to the paper you sent us earlier)

Greece
The image of contemporary Greece is badly distorted in geography text books of other countries. The verbal (text) information used tends to be stereotypical of a country with a rich past history and little, if any information on the present state of affairs in Greece is provided. The visual information used is also stereotypical of either an ancient (classical) or rural (peasant) world. Ancient Greek temples and Greek peasants riding donkeys dominate in visual images of contemporary Greece as portrayed in geography text books in other countries. A more updated (both verbal and visual) view of Greece is warranted.

Japan
The image of Japan is sketched farely well in all the other countries. The main figure of Japan in these foreign textbooks can be described as a country where a rapid technological and industrial development has taken place. The number of section pages is rather bigger than most Japanese students suppose.

Sweden
The image of Sweden is almost "non-existant" in geography text-books. There are no Swedish examples in the books from Australia. In one book from Greece, Swe-

den is noted among the Scandinavian countries. In Japan nothing is referred to Sweden but the export of minerals. The book from the USA has a few odd remarks about a power less king and a conflict with our neighbouring country Norway.

It is quite clear that Swedish pupils have to learn a lot more about other countries than the pupils in those countries are able to learn about Sweden.

USA

It is interesting to note the dominance of the information about the USA in relation to the information available about Australia, Greece, Japan and Sweden in the different geography textbooks. This researcher was not previously aware of the USA.s dominance in textbooks. Without a translation of the texts it is not possible to assess the validity of the information presented to pupils and teachers in the other countries. One analysis, I assume, would reveal the political, social and economic relation between those countries and the USA. It is almost too obvious to note that the USA textbbok displays the USA's economic and political positioning of itself to the countries mentioned or not mentioned. Not discussing or including any county is an important point to consider.

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Appendix 1. Comparisons of "Index of frequency" and "Picture index" for 30 textbooks from Canada. Data based on information in Evans, M. A., Watson, C., & Willows, D. M. (1987).

Textbooks	Number of pages	Number of illustrated pages	Number of pictures	Index of frequency	Picture index
Readers					
Journeys Grade 1	379	379	379	100	100
Journeys Grade 2	481	431	444	90	92
Expressways Grade 1	346	337	348	97	101
Expressways Grade 3	312	214	222	69	71
Expressways Grade 5	438	286	307	65	70
Impressions Grade 1	481	477	499	99	104
Impressions Grade 3	251	215	216	86	86
Impressions Grade 5	309	107	106	35	34
Impressions Grade 7	496	151	151	30	30
Mathematics					
Mathways Grade 1	340	245	302	72	89
Mathways Grade 3	341	341	456	100	134
Mathways Grade 5	372	351	524	94	141
Mathways Grade 7	254	287	346	100	136
Starting Points Grade 1	236	233	260	99	110
Starting Points Grade 3	310	265	322	85	104
Starting Points Grade 5	336	254	294	76	88
Starting Points Grade 7	399	327	386	82	97
Starting Points Grade 9	331	211	226	64	68
Holt Mathematics Grade 1	256	246	337	96	132
Holt Mathematics Grade 3	306	246	289	80	94
Holt Mathematics Grade 5	346	296	336	86	97
Holt Mathematics Grade 7	346	236	290	68	84
Holt Mathematics Grade 9	351	173	184	49	52
Holt Mathematics Grade 11	328	198	199	60	61
Science					
Life Probe	445	374	457	84	103
Science Ways Blue	372	247	287	66	77
Science Ways Green	367	236	269	64	73
Biological Science	772	483	510	63	66
Physical Science	437	212	217	49	66
Biology of ourselves	488	246	270	50	55